The Province of Alberta

PETROLEUM AND NATURAL GAS CONSERVATION BOARD

IN THE MATTER OF THE GAS RESOURCES PRESERVATION ACT

AND IN THE MATTER of a Joint Hearing to determine various questions relating to the proposed Export of Natural Gas from the Province of Alberta.

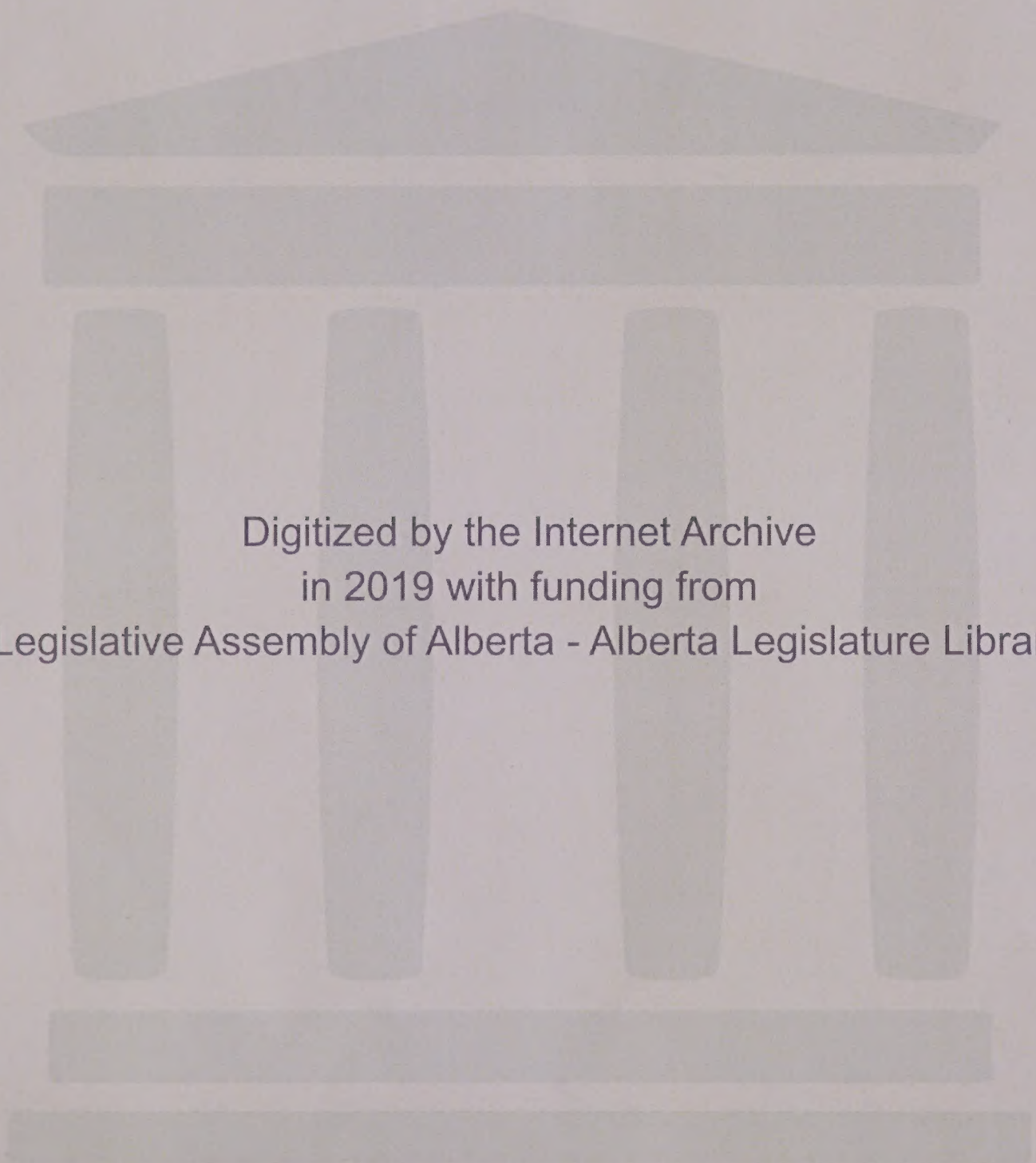
I. N. McKinnon Esq., Chairman

D. P. Goodall Esq.

Dr. G. W. Govier

Session: September 25th, 1951.

Volume 10.



I N D E X

VOLUME 10.

September 25, 1951.

W I T N E S S E S

EVERETT G. TROSTEL:

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Discussion re Adjournment.

VOLUME 10.

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MR. STEER: Mr. Chairman, in regard to the matter of adjournment that was mentioned yesterday, the Utilities Board has before it a rate case in Edmonton and had tentatively fixed the 18th of October for the consideration of the rate schedule in connection with that case, and those proceedings might easily run over into the week of the 29th of October. Both Canadian Western and Northwestern are interested in these proceedings and consequently I am suggesting, if otherwise it is agreeable, that the adjournment ought to be to some date later than the 22nd of October as suggested.

MR. NOLAN: Mr. Chairman, I have had an opportunity of discussing the matter of adjournment with my clients since we met yesterday. As you know, we are very anxious to bring these hearings to a final conclusion, and if it does not meet with the convenience of the parties to meet prior to the 22nd of October, we hope that the Board will be able to hear the second application not later than the 22nd of October.

MR. S. B. SMITH: Speaking for my clients, as we will be ready to go on on the 22nd of October, I would like to see the proceedings carried ahead with reasonable speed, so far as that can be accomplished.

MR. PORTER: My clients will be ready to go on on the 22nd but I have some commitments that would make early November much more convenient.

Discussion re Adjournment.

MR. MAHAFFY: Mr. Martland, representing Western Pipe Lines, sir, was advised of the Board's statement yesterday. He was in Edmonton and it was sent to him by telegram and he made every effort to be here this morning but on account of the weather the planes were not able to bring him here, and he asked me on his behalf to say to the Board that due to some changes which had been made in their market arrangements it is necessary to revise their material and he would find it quite difficult to be ready on October 22nd. He did suggest this, that if the Board could see fit to extend that date by approximately a week that he felt Western Pipe Lines could be ready to proceed, sir.

And, Mr. Chairman, while I am on my feet - and incidentally for the first time at this particular session with respect to my client, Alberta Inter-Field Gas Lines Limited - I am instructed to say that October 22nd or any other date suitable to the Board and to the other parties to the proceedings is satisfactory to Alberta Inter-Field. Sir, may I add just a word of explanation with respect to our position in these proceedings at this time. In the Board's Interim Report of January 20th, 1951 you made reference to our proposal for a Provincial gathering system and the advantages claimed for that system of gathering gas within the borders of the Province of Alberta. You stated, sir, and I wish to quote:

> "While recognizing the desirable features of such an integrated system, the Board is not at this time prepared to state whether in its opinion the scheme is necessarily economical and practical."

Sir, at previous hearings we submitted briefs and comprehensive engineering reports covering the proposed gathering systems. The engineers' reports were prepared by Stone & Webster Engineering services. As further applications were received by the Board it was deemed inadvisable to spend additional sums of money on the engineering work, since the basic principle involved had already been established. Nevertheless, Mr. Proctor, General Manager of the company, and myself, representing Alberta Inter-Field, have attended all public hearings of the Board and we will attend the proposed hearings commencing on October 22nd or at such other time as the Board decides. If, as and when an export permit or permits are granted by the Board, Alberta Inter-Field will be prepared to immediately submit a plan of Provincial gas gathering to suit that particular scheme or schemes and to ensure diversification of supply to Alberta consumers. We will hope at that time to satisfy the Board that the Provincially-controlled gathering system is, to use the Board's words, economical and practical, and moreover, that it is highly desirable in the interests of this Province.

MR. C. E. SMITH: Has Mr. McDonald anything to say?

MR. McDONALD: With regard to the matter of adjournment, my instructions are to proceed as soon as possible, and having in mind the 22nd of October as the date set by the Board we are agreeable, but if there is going to be an adjournment I respectfully submit it be not longer than one week.

MR. C. E. SMITH: Mr. Bredin shakes his head and says

he hasn't anything to say. I wonder if the two counsel, I think Mr. Steer and Mr. Porter, who have mentioned that the date was not convenient to them, could suggest to the Board a date that would be, just on the off-chance they could get together for a change.

MR. STEER: I am only suggesting a postponement for a further week, sir. I would not suggest that, sir, were it not that the Utilities Board has tentatively fixed that date and it would be a matter of very great inconvenience to that Board if they could not proceed, and it would be of great inconvenience and expense to the Northwestern Company if they could not proceed at that time.

THE CHAIRMAN: I had some conversation with Mr. Blackstock with respect to those Hearings and I know he postponed his Hearing to enable counsel to attend this Hearing. I think in view of the circumstances we will adjourn to October 29th.

EVERETT G. TROSTEL (recalled)

already sworn, continued examination by Mr. Porter:

Q All right, Mr. Trostel.

A There were several questions, Mr. Chairman, that I was asked yesterday which in the interests of saving time were reserved for answer until today. I attempted to find the answers to those questions as far as I could in the interim.

The first point, I believe, that was raised and which I did not have the answer for was the Hearing before which the data which Mr. Gordon

Connell presented on the Turner Valley field, such basic data which formed the background for our deliverability work on Turner Valley. I find that that Hearing was a Canadian Western Natural Gas Company rate hearing on Turner Valley, a Hearing before the Board of Public Utility Commissioners in January 1949.

Another question which was directed to me in regard to Turner Valley was the question of the economics of drilling wells as proposed, and also the resulting spacing in the gas cap. I believe Turner Valley is rather a different condition so far as the development or the drilling of wells, as proposed, is concerned from most of the rest of the fields. Now, on a basis of the reserves and the estimated cost of drilling the proposed wells, one could compute an equivalent balancing value for natural gas of 1¾ cents an Mcf. However, I do not believe that is a proper figure that should be applied in as much as the primary purpose of suggesting the drilling of additional wells is to provide deliverability, so that the reserves could be produced in a period of 30 years, which seems to be reasonable economics. That was one suggestion as to an approach for building deliverability. Possibly deliverability could be increased so that the reserves could be produced in a 30-year period by perhaps well work-overs. I do not know enough about the data. Perhaps an acid program and cleaning out would contribute materially to deliverability. It is also possible to arrive at that deliverability in lieu of drilling wells by resorting to

increased compressor facilities. Our deliverability calculations were based on a minimum of 100 pounds per square inch wellhead operating pressure. For perhaps an economic viewpoint, it might be less expensive to achieve increased deliverability through the lowering of the back pressure rather than the drilling of additional wells. I repeat that the concept of drilling there, I do not believe, should be tied to reserves because given a long enough period of time the current wells, I believe, should be able to produce the reserves. The concept of the additional need for deliverability was postulated on producing the reserves over a period of 30 years.

In regard to spacing, which I believe you asked me, Mr. McKinnon, I yesterday had an idea in my mind of around 10,000 acres for the area of the gas cap. Further checking leads me to believe that that is a maximum area and the area may be as small as 8500 acres for the area of the gas cap. There is some fringe range as to the up-dip edge which contributes to that range. According to data available from the January 1949 report, there were at that time 95 wells capable of production. That would be an average spacing on an 8500 acre reservoir of 90 acres per well. I believe at the present time there are only 92 wells capable of production including the input wells. The 152 well figure which was presumed in our deliverability forecast would reduce the average spacing to about 56 acres per well on an 8500 acre supposition for the total acreage of the gas cap.

E. G. Trostel,
Dir. Ex. by Mr. Porter.

I mentioned yesterday the probable desirability of needing additional wells in the gas cap to provide adequate drainage. I should like to qualify that to say adequate drainage in line of meeting a future rate of production. There is some evidence, and I have not done enough work personally on the field to know, but there is some evidence to indicate that the gas cap is not continuous throughout its entire extent. The degree of the barriers that may separate the gas cap in as many as 7 divisions I am not completely familiar with. I would not be able to draw the barriers or separate them. However, it is noticed that the wells have been greatly concentrated as far as distribution is concerned with the indication that there may be separate drainage blocks in order to produce uniformly through the gas cap over an extended period of production in the future. I believe it is desirable to have additional wells distributed over the fields to more or less fill in the spaces that now are relatively blank. I made a further check in regard to Turner Valley and the question of processing facilities, which you asked me about yesterday. The maximum production which was proposed in the particular deliverability schedules which appear in volume 3, the peak production occurs in 1959 on the assumption of a 45 per cent load factor, which will result -- perhaps I should refer to the exhibit.

Referring to the projected performance chart on page 2 of Census Division 4 of Exhibit 10, column 11, the estimated gross peak day volume at a 45% load factor in 1959 from the associated gas reservoir and the gas cap would be 117 million, 500 thousand cubic feet per day. In addition to that there would be produced under this in 1959, according to the schedule appearing on page 3 of Exhibit 10, Column 2, an estimated gross annual gas production of dissolved gas, an item of 12,700 million cubic feet, equivalent to 34,800 Mcf per day. That then will give a total peak day of approximately 152,300 Mcf per day gross. I did not have data concerning the exact capacity of the processing equipment. However, I did note in the 1950 production report of the Conservation Board that in January '49 Turner Valley produced at a rate of 141,000 Mcf per day, January, 1949, so the peak figure proposed on a rate, or on a load factor of 45%, would exceed that capacity by about 8%.

Q THE CHAIRMAN: It may have produced that, Mr. Trostel, but I do not think there was marketable gas to that amount sold. I understand the capacity was something around 95 million maximum. Now, they do augment that with gas from Bow Island, and there is a peak day in the system of around 140 million, but I do not think that the Turner Valley facilities alone would process around 145 million, that is, net gas.

A These were gross figures produced in the field, not necessarily processed and net.

Q This figure that you are giving us here is marketable gas peak?

Q No, I am sorry. The figure that I am referring to is gross production from the field, not the marketable. The figures that we have set up here are for reservoir control and attempting to value the per cent of well head gross capacity. These figures then have been reduced by 38% over-all allowance for shrinkage, waste, compressor fuel and so forth, to arrive at the net figures. I believe those are shown on page 3. Well, unfortunately, I have no comparable figure available except to show it is gross and net on the daily basis. It would have to be converted from annual net.

Q DR. GOVIER: Would you apply the 38% discount to your 152 figure, Mr.Trostel, to get the equivalent residue gas output?

A That is what has been done in this projection. I believe it is probably too high a correction for losses from the standpoint of the gas cap production alone. However, that figure was maintained and applied to the total gas of Turner Valley on a basis that the losses of gas from the oil band would probably continue or, at least, would not abate as the pressure dropped.

Q THE CHAIRMAN: On the basis of gross production then what would be the figure with that discount factor?

MR. PORTER: That is, assuming 45% load factor too?

THE CHAIRMAN: Yes?

A That maximum rate would, 152,300 Mcf gross per day would be approximately 94,500 net to pipe line.

Q Taking the 38% discount?

A That is correct. I find I made an incorrect answer on reading the transcript last night to your question, Dr.

Govier, in regard to Leduc when you asked me if the gas figure - if you will bear with me for a moment, I will find the reference.

Q Yes.

A While I am looking for it, it was in regard to the question of whether the gas production shown in a particular exhibit was for the Leduc field total, and I said "Yes", and I think, however, I said that it was for the Leduc D-3 only.

Q DR. GOVIER: I imagine that is page 4, Census Division 11, Exhibit 23?

A I must have gone by that and did not see it.

Q It was in connection with column 6, I think, that I asked that question, Mr.Trostel?

A That is correct. Thank you, for helping me find it. As just mentioned, this particular page, page 4 of Census Division 11, Exhibit 23, pertains only to the D-3 gas. I might mention at this time I find it was an oversight yesterday that our deliverability schedules have been based solely on non-associated or free gas with two exceptions, that is, Turner Valley and the D-3 in Leduc. Other than that, we have given no consideration in estimating for production from anything but the free gas fields. That, I believe, will answer your question. We did not put into the record an estimate of future gas production from the Leduc D-2 horizon. However, there is an exhibit on the Leduc Lower Cretaceous gas productivity. I had better refer to that.

Q What was your thinking in omitting the D-2, Mr.Trostel?

A Largely a matter of simplification handling the work,

that we considered only the dry gas fields as such, dry gas reservoirs. By that I mean entirely non-associated reservoirs except where large volumes were being processed at the current time. We were unable to tell from records available how much of the D-2 gas was going to the plant at Leduc, and how much of the D-3, and we noticed that the total amount of the gas processed was not as much as the total D-3 production, and that was another factor that led us to leave that out, out of that particular dissolved gas projection, although the reserves are quite material.

Q Are you suggesting then that the amount of the reserves should be subtracted from the total presented by Mr. Dougherty?

A No, sir. I am merely saying that in building our deliverability estimate we have taken only the fields which were, perhaps, simpler to compute and on which we had the best data for making projections. We have not included all the fields and all the reservoirs in these projections. We have left out several just for a matter of lack of time and difficulty in making a good projection. The D-2, I think, is also difficult to project because of assumptions necessary in developing that particular reservoir, and also in predicting the gas/oil ratio trend inasmuch as experience to date on data available to us has not been too indicative. In appears that it is a depletion-type reservoir.

Q To a degree that provides a sort of safety factor in your deliverability exhibit?

A That was our concept.

Q In that you have not t aken it into account?

A We have not taken into account certain reserves, that is correct, which will, I am sure, become available in the future for sale as adequate plant facilities are constructed,

Q Mr.Trostel, surely the impact of that production is important on the economics of the processing plant, and, therefore, on the figures that you show in Column 6?

A Well, again, Column 6 is only part of the Leduc picture to which, if we add Lower Cretaceous, which we have estimated could be produced at 10,000 Mcf per day, starting in 1951, and plotting it up to a peak of 35,000 Mcf per day in 1965, maintaining a rate of 35,000 Mcf per day for the following 6 years, and then 25,000 Mcf a day for the subsequent 24 years, and 20,000 Mcf per day for the subsequent 20 years.

Q Where is that reference?

A I started to look for that a moment ago. It appears in our early projection on page 33B, Census Division 11, Exhibit 4A, or Volume 2. That is the data submitted in the May Hearing. The figures which I have just cited are those of Column 5 of that Exhibit.

Q Is the year 1 to be interpreted as the year 1951?

A As a matter of f act, that should be t he first year in which export is granted. This particular d eliverability schedule is a projected performance schedule which w as prepared for showing the proposed performance of possible gas supply fields of the Trans-Canada, and it was worked on a 25-year basis.

Q Does it propose the drilling of new wells specifically for Lower Cretaceous production?

A It proposes the completion of 32 additional wells from the first year of production to the 9th year, I believe. They would be either dual completions, re-work of current wells, or would be new wells drilled.

Q Either would be economicalin your opinion, is that right, Mr.Trostel?

A I believe so, sir. It is a question of when the operators wished to get their money back, provided a market were available.

Q MR. C. E. SMITH: And how much the other fellow wants to pay, Mr.Trostel?

A That is correct, sir. However, I stated in Turner Valley, and retracted my 2 cents per Mcf as being a guide for the development of deliverability wells in Turner Valley a short time ago today. Nevertheless, the reserves and availability predicted for the Lower Cretaceous sands, we feel would be justified on a basis of 2 cents an Mcf reserves in the ground.

Q MR.PORTER: Drilling costs?

A Yes, quite, drilling costs.

Q DR. GOVIER: Mr. Trostel, would you care to go ahead and indicate to us what the total picture for the Leduc-Woodbend Field would be,in your opinion?

A To tell you the truth, sir, I never compiled this data together as a unit. There would be quite a smoothing effect. With regard to the discussion in regard to Column 6 of page 4, Census Division 11 of Exhibit 23, the general period shown on the Table, Column 6, where the rate is on the order of, say, 6600 Mcf per day down to 3900 Mcf per day, that particular period, provided the

drilling of Lower Cretaceous completions were started immediately, would be augmented by 35,000 Mcf per day from the Lower Cretaceous, which would be the peak production in our estimate from the Lower Cretaceous which you would take out from that particular valley, or the lowest point of that valley.

Now, with regard to the D-2 solution gas, I have not made an estimate in the forecast of that. However, there is indication from what little individual well data I have had an opportunity to review, that very likely the gas/oil ratio will rise rapidly as production takes place, which is rather typical of a tight depletion-type field.

(Go to page 799)

E. G. Trostel,
Dir. Ex. by Mr. Porter.

In our opinion it will take several years at the current rate to develop that horizon fully, based on our proved and probable acreage and a 40-acre-per-well spacing. Something like only one-third of the total wells to complete their development have been drilled up to the current time. That will have the effect of tending to hold down the gas/oil ratio for the reservoir as now drilled, but eventually the gas/oil ratio in that horizon will increase, I feel, quite sharply. Checked as against recent production data available it indicated that some 9500 Mcf per day was currently being produced from the D2. I would estimate that there will be a peak reached probably in about 15 or 20 years of some 50 to 60 thousand Mcf per day in that particular reservoir. As I said, I have made no investigation. I have not made any estimate other than the one just cited on the D2 available in the future. I do not think that the gas to be produced from the D3 gas cap in the early future, which I think I pointed out to you yesterday, sir, will be substantial. The more substantial volumes would be by production from the Lower Cretaceous and from the D2 already mentioned. Now, you asked me one other question, Dr. Govier, that of contrasting our proposed future rate of production with the rate of production that I believe was submitted by Dr. Dixon. I had an opportunity of reviewing his report rather hurriedly last night. I imagine the results would be rather similar, if we had put together the three horizons; that is, the Lower Cretaceous, the D2 and the D3.

We feel it will be possible to restrict the D3 gas cap production for a longer period of time than does Mr. Dixon.

Q DR. GOVIER: You would be in substantial agreement with him so far as you have looked into the question?

A Yes, I think that is the case generally. However, we had more reserves set up in the D2 horizon than Mr. Dixon.

Q Have you estimated the projected total production for the Leduc field?

A We have estimated the Lower Cretaceous production at 10,000 Mcf per day for 5 years, 12,000 Mcf per day for the following 2 years, 15,000 Mcf per day for the following 3 years, 25,000 Mcf per day for the succeeding 4 years, and 35,000 Mcf per day for the following 6 years, 25,000 Mcf per day for the following 3 years, and 20,000 Mcfpper day for the following 2 years.

Q Where do you find those figures?

A I am sorry. These figures appear on page 3(b) of Census Division 11, Exhibit 4A, and in particular in Column 5. There is a fundamental difference between Mr. Dixon and ourselves as to the recovery mechanism for the D3 reservoir. and in our opinion the production of the D3 gas cap gas can be prevented for a longer period of time in the interests of conservation. There is one question asked me by Mr. Porter an which I promised to get some information over night. Mr. Porter, you asked me the density of the drilling in the sedimentary basin of Alberta. We attempted to check that yesterday. Our best estimate is that in the Alberta sedimentary basin there are more than 156,800 square miles. The drilling is in excess of 100 million acres.

Q MR. PORTER: 100 million acres?

A I am sorry, yes, 100 million acres. Up to January 1st, 1941 were drilled approximately 1500 dry wildcats. On that basis it means that there are 66,800 acres per dry wildcat. Some 104 square miles per dry wildcat. If the discovery wells were classified as wildcats there would be about an additional 150 discovery wells had been drilled, furnishing a total of about 1650 dry and productive wildcats. For such wells there are 60,800 acres per wildcat drilled, equivalent to about 95 square miles per wildcat.

Q One well in 95 square miles in the sedimentary basin?

A Yes.

Q DR. GOVIER: Did you have any other figures for comparative purposes?

A I am afraid not. I might say it is a remarkably large figure per well.

Q I am wondering what it would be in Texas, Mr. Porter?

MR. PORTER: I do not know.

MR. STEER: Everything is big in Texas.

MR. GOODALL: What would it be in Saskatchewan?

A I believe that to the best of my ability is the answer to the question raised yesterday. Now, might I make one correction which I noticed yesterday, and that is on the scale which is shown on Exhibit 25, the average daily rate in MMcf. The scale shown there is hort one zero. That 10 should be 100, the 20 should be 200 and the 70 should be 700.

Q MR. C. E. SMITH: Repeat that?

A Yes, sir. Just add a zero to the numbers shown. The chart as read would indicate Alberta requirement are only 15 million a day rather than 150 million a day.

THE CHAIRMAN: Does anyone wish to cross-examine Mr. Trostel.

Q CROSS-EXAMINATION BY MR. STEER:

Q I have a few questions, sir. I wonder if you would look at page 2 of Census Division 4 in your Exhibit 10, Mr. Trostel?

A Yes.

Q Do I understand that the evidence you gave us yesterday with regard to Census Division 1, that is the field that is commonly known as the Pakowki Lake field, that the evidence indicating the method you employed in making your computations with regard to this field extends also to two, namely Turner Valley and Leduc-Woodbend?

A That is substantially correct, sir.

Q And when you come to deal with Turner Valley you are advocating the drilling of 57 new wells within what length of time?

A Six years.

Q From now?

A No, that would be - well, within a period of 10 years from now, or from the time the export of gas is granted. This is all postulated on that.

Q The purpose of drilling these 57 wells, as I understand you, is to get from Turner Valley the greatest amount of production possible over the next period of 30 years?

A That is correct. That is one method of doing it. There might be others.

THE CHAIRMAN: I wonder if we might adjourn for a few minutes now.

(At this stage there was a short adjournment taken.)

Q MR. STEER: Can you tell us, Mr. Trostel, what you think would be the result of the drilling of those 57 wells over a period of approximately 10 years on the amount of gas to be produced from the Turner Valley field?

A Yes, sir. Let us say the answer to your question is found in the summary, in these projected performance studies.

Q Let us look at it, will we?

A Yes, sir.

Q In exhibit?

A You refer to page 2, census division 4, Exhibit 10.

Q Yes, I have it in front of me.

A Column 6 of that exhibit gives the daily average gross gas production in Mcf.'s, which is postulated with the result.

Q Now, that is to say that in the year, we will say 1959, column 6 would give us 52 --

A 52,900 gross Mcf. per day on the average.

Q Yes. Well now, we have had a lot to do with Turner Valley in connection with the Canadian Western distribution system, and I have the idea that as it stands today Turner Valley is capable of producing and delivering into the Calgary system 95 million cubic feet of gas.

A On a peak basis?

Q Yes.

A This is on an average basis, the figure to which I refer, the average spread out over a 365-day year.

Q I see. Then when we want to consider peaks we come to

your column 11, do we?

A For 45 per cent load factor, yes, sir.

Q Do you know what the load factor of the Canadian Western system is?

A I believe it is extremely low, sir, in the neighbourhood of 40 per cent at the present time.

Q Yes, it would be around this 45 per cent, wouldn't it?

A That is correct, sir.

Q Yes. Now, do I understand on a 45 per cent load factor and on your plan in the year 1951 there is to be taken out of Turner Valley 48,700 Mcf.?

A To be taken out of the Rundle Limestone associated gas reservoir on a peak day, yes, sir.

Q Well, what gas is there besides that in Turner Valley?

A The major production of gas on a daily basis at present is coming from the oil wells. That is shown on page 3 of this exhibit. I could dig up the data for the year 1950, I believe, but 1951 is somewhat typical, and 1951 we see on a basis of order of magnitude that this 1951 is similar to 1950. That is, my estimated 1951 on column 2 and column 3 of page 3 indicates that out of a total of some --

Q Just one minute, please.

A Page 3, sir. It is the following page.

Q Oh, yes, here we are.

A For example, of a total of 36,700 million cubic feet of gas proposed to be produced in 1951, some 8,000 would be from the gas cap and some 28,700 would be from the dissolved gas area.

Q Yes?

A And that is about typical of the performance in 1950.

Q Now, the total gas that would be got from both sources in Turner Valley in 1951, according to your plan, then would be 48,700 plus 62,300, column 6 on this next page?

A No. That happens to be combining two different types of figures, sir.

Q Tell me what in your view in 1951 would be produced from both these sources in Turner Valley?

A 36,700 million cubic feet of gas for the year 1951.

Q From both sources?

A From both sources.

Q And what is the demand for Canadian Western over the year, do you know?

A I do not know, sir. However, I know that a close approximation of what was produced totalled in 1950 --

Q Produced from --

A Turner Valley. Produced total in 1950.

Q Now from your figures, will you tell me whether you can see for 1951 and the following years more delivered from Turner Valley than 95 million a day?

A As a matter of fact, sir, from the standpoint of gross or average yearly production we show a steady decline in the total gas to be delivered from Turner Valley, in a decreasing manner as indicated by column 4 of page 3. For example, in 1951, 36 billion 700 million; 1952, 35 billion 300 million; declining to 32 billion as estimated for 1954, in which an attempt at that time was made to hold that total at that figure for as long as possible.

Q Yes. Well, you understand, of course, that Canadian Western is counting on Turner Valley over the next 10-year period being able to meet peaks of 95 million a day?

A Yes, sir.

Q You understand that?

A Yes.

Q Now, does your scheme indicate that Canadian Western will receive that quantity of gas over that period?

A No, there is nothing in our schedule that says anybody receives anything. In other words, this is a productivity met at the tail-gate of the plant or at the tail-gate of the field without any stipulation as to whom specifically the gas is delivered. That was not part of our study.

Q If Calgary is to receive from Turner Valley peaks over this 10-year period you are speaking of of 95 million a day, do you say that under your scheme it can be received?

A The intent of the drilling program as proposed was actually to increase the peak deliverability. It would have that effect.

Q To what extent would you increase the peak deliverability by your drilling scheme?

A I will have to do a little bit of calculating here. The peak is only of the gas cap and the major amount of gas comes out of the oil band.

Q If you do not mind doing it. What I am interested in, Mr. Trostel, just so you will make your computations consistent with my question, what I am interested in is finding out whether under your scheme at any time more than 95 million cubic feet a day is to be delivered out

of Turner Valley from both sources?

A That is on a net basis?

Q Yes.

A No, sir. That happens to be the peak and we maintain it by the drilling as long as we can, finally it tapers off. In fact, that peak is reached, as was discussed earlier this morning, in 1959.

Q So that if the processing facilities and if the transmission lines existing today are capable of handling 95 million peak capacity, then no further consideration in those respects is necessary?

A That is correct. Through 1959 that can be maintained, according to our figures.

Q Yes, and if the present capacity of Turner Valley is sufficient over the period of 8 or 10 years to deliver that 95 million peak a day, then your 57 wells are additional for the purpose of getting that production speeded up, am I right in that?

A I would not quite use those words, sir. If I may paraphrase, the basic concept of our study was to provide a maximum reasonable deliverability over a period of 30 years from the existing fields, and we attempted to take as far as possible a reasonable concept in building that, each one would stand on its own feet, and then we finally put them altogether by adding up the results at the end.

Q Yes?

A Does that answer your question?

Q I am wondering from the point of view of Turner Valley

as a gas supply for Calgary, why the necessity of drilling these 57 wells, because I must tell you, Mr. Trostel, that this question has been studied for years, and as I understand it, a scheme has been developed by the storage of gas and the processing of gas and the gathering of gas by the Madison Gas Company under which the gas cap is going to be most economically developed by the drilling of not more than 5 or 6 additional wells. Now, what I am interested in is why drill those 57 wells?

MR. PORTER: I think if my learned friend wants to question the witness by comparison between the Madison system and this proposal, it might be well if we had the Madison system before us. Now, the Madison system was evolved on an entirely different concept and with entirely different reserves than are now available in the light of the Madison experience. I would like very much that this witness compare them. I think we should have them before us or he should have an opportunity of seeing what the Madison concept was so that we will have a comparison that will be worth while, and I suggest that he be given a chance to have a look at it.

MR. C.E. SMITH: He is putting a hypothetical question.

THE CHAIRMAN: I think the question is a fair one from the point of view of whether it is necessary to have the 57 wells to properly produce the gas.

MR. STEER: I do not need to refer to the Madison system, sir.

Q I am going to ask you this, Mr. Trostel.

MR. PORTER: If I may urge. I do not think the Madison system will produce that peak. My memory of it is it won't.

MR. STEER: Perhaps we had both better give evidence.

Q Mr. Trostel, I want you to assume that there is a plan in effect now under which Calgary can be supplied with its peak over the next 8 or 10 years on a basis of 95 million cubic feet a day peak and that that can be done either with the present wells or not more than 5 or 6 additional wells. Do you follow me?

A Yes, sir.

Q You make that assumption?

A I understand you make that assumption.

Q Well, I am asking you to make the assumption. Then I am going to ask you why the necessity of drilling these 57 additional wells or 50 wells over and above the 6 or 7 I speak of?

A I believe I can answer that on the basis of my data. I am unable to tell nor am I familiar with the system which you propose. We have set up a basic concept of Turner Valley that we would attempt to produce the gas wells on an average basis at a rate not to exceed 25 per cent of the wellhead open flow capacity, and our peaks are built around the use of a 45 per cent load factor. Now, it is quite possible to produce gas at a higher rate than that if one wishes to pull harder on the wells, and I think for perhaps a peak day or two it might not well hurt them. However, we have been guided by that

fundamental and I think conservative concept as to well performance. Another basic assumption we have made is that the wells we drill will not be any better than the average of the ones we have. That, perhaps, is a conservative approach but we have made that or, as I believe, if I am correct in this, and I am not positive, but I think I am correct in it, when certain of the wells from the gas cap were abandoned it was done on the understanding that if necessary that deliverability will be replaced by new drilling.

Q That was an understanding I think you spoke of yesterday?

A Yes.

Q Between the Royalite Company and the Government, I think you said. Have you any information about that that you can give us?

A I have only hearsay information, sir, but it is my understanding that one of the recent wells drilled was of such excellent capacity that it replaced the necessity for the drilling of several wells which had been abandoned. In other words, the new well was much better than a group of older wells or was as good as a group. Now, we have not attempted to predict that we will find better wells in this study than the average well that now exists. I think we took quite a conservative position in that regard. Further, as mentioned earlier this morning, there may be ways of improving the performance of the wells but we have no way of getting that information, no way of discussing it. Perhaps we could have if we had taken time to work on it.

Q You have not had any discussions with the Royalite Company as to their views on the best way of developing this field?

A We have not talked to Royalite on that viewpoint in regard to deliverability, no, sir.

Q I see. Am I right in thinking that your evidence is that you will drill 57 wells, and I suppose you know the cost of them, do you?

A I find they are quite expensive, sir.

Q $175,000, $200,000 a well?

A Oh, no, sir, I do not believe so, not for a gas cap well.

Q Have you any idea how much they do cost?

A Around $100,000.

Q My instructions are that the cost today of drilling those wells is around $175,000. You would question that, would you?

A My information given to me yesterday was around $100,000, sir.

Q Would you be aware of how many bits are used in the drilling of these wells?

A No, sir. I have no way of evaluating from that score. However, I do not know whether the most modern technique of diamond coring has been used to the full extent.

Q If my assumption is correct, and if there is a plan being operated today for the supply of gas from Turner Valley for a period of 8 or 10 years without the drilling of these 57 additional wells or with the drilling of 5 or 6 of them, then your additional 50 wells are being drilled in some way for the promotion of the export of gas?

A No, I do not feel that way, sir, at all. This could be accomplished by the drilling of 5 or 6 wells to build up the deliverability which we have here, which is a peak of 95 million a day, then I think that would be fine if it could be done with 5 or 6 wells.

Q Suppose Royalite says they can deliver 95 million a day peaks over 8 years with the drilling of 5 or 6 additional wells, then does that alter your plan?

A Of course, our plan is not based solely on peaks, it is based also on total production over the year.

Q Then it is not specifically related to Calgary at all, it is related to the general scheme of export of gas?

A Well, it is related to supplying the needs of the Province.

Q Yes. Now, you told me about the method you had employed and that you had given special treatment to Turner Valley and Leduc-Woodbend. I do not intend to question you about your treatment about Leduc-Woodbend but am I right in thinking that Exhibit 23 includes all the reservoirs and fields that are mentioned in Exhibit 10?

A If Exhibit 23 contains - -

Q All the reservoirs and fields that are dealt with in Exhibit 10?

A It contains the summary of production but it does not contain the projected performance of each of the fields.

Q No, but it deals with the production of each one of the fields that can be expected, from each one of the fields in your Exhibit 10?

A No, only those that we selected to be used for

calculation of deliverability.

Q Oh, I see. In other words, is it in accordance with the notations in Exhibit 10, there are certain fields you have dealt with but have rejected for this plan?

A I do not believe there would be any way of checking that outside of counting them, sir. We never set up a schedule on that.

Q But you dealt with fields in Exhibit 10 which, for the purposes of your estimate of deliverability, you have ignored altogether.

A That is right. We ignored all the solution gas that was difficult to calculate and estimate. We had a limited amount of time so we only took, in building our deliverability schedules, we only took fields we could estimate the most easily. That embodied most of the fields but it is not 100 per cent complete.

Q So that would I be right in this, let us look at census division 1 in your Exhibit 23, that shows, I take it, in column 5, deliverable gas of 480,000 MMMcf., 480 billion Mcf.?

A Yes.

Q 480 billion cubic feet, I should say?

A Yes, 480 billion.

Q And then I can go through all the rest of those census divisions and pick out the corresponding figure, and I have done that, and I have added them up and I get a figure of 5.6 trillion feet. Do you think that would be right?

A Reserves in census division 1?

Q No, in the whole thing. I have taken that corresponding figure in each one of the census divisions and I have added them up and I get a figure of 5. something trillion feet, and I wondered how that could be reconciled with your 6.5 trillion in column 4 of Exhibit 25-A.

A Would you read that back?

BY THE REPORTER (reading):

"Q. No, in the whole thing. I have taken that corresponding figure in each one of the census divisions and I have added them up and I get a figure of 5. something trillion feet, and I wondered how that could be reconciled with your 6.5 trillion in column 4 of Exhibit 25-A."

Q MR. STEER: Should they be the same?

A What is column 4 of Exhibit 25-A?

Q Well, it is, as I take it, the total Provincially of deliverable gas.

A I am sorry. That figure corresponds, sir, in Exhibit 25-A to column 3 of the exhibit following the tab labelled "Provincial Deliverability" of Exhibit 23.

Q Quite so. Now, then, if you look at your column 3 on your Exhibit 23, that is the same figure, 6.5 trillion?

A Yes.

Q If I added together the 480 billion in census division 1, which you call estimated net annual gas deliveries?

A Yes, sir.

Q Do you see that?

A Yes, sir.

Q Now, if I used that and the corresponding figures in ea each one of these Census Divisions, should I get a total of 6.5 trillion?

A You should.

Q I should?

A Yes.

Q Well, there is something wrong with your exhibit, or else there is something wrong with my additions, because I get 5 trillion, 612 billion, 350 million?

A Well, sir, we checked that figure, and cross-checked it, and box-checked it, and I think my arithmetic is right.

Q You do?

A Yes.

Q And you think I am wrong?

MR. C. E. SMITH: Maybe Mr.Steer added those in Exhibit 23.

Q MR. STEER: I did add those in Exhibit 23, and I understood you to tell me that they include all the figures?

A That is correct, if you take the proper summary figures for each Census Division.

Q Now, let us see about that?

A Yes, sir.

Q I took from Census Division 1, 480 billion?

A Yes, sir.

Q And I took from Census Division 2, 1 trillion, 90 billion, 935 million?

A Yes, sir.

Q Page 1 of Census Division 2?

A Yes,sir.

Q Column 3?

A Yes, sir.

Q That is right?

A That appears to be the right figure?

Q And then I took for Census Division 3, 1 trillion, 125 billion, 871 million?

A Yes, sir.

Q And then I took 366,400?

A Yes, sir.

Q And then 473,865?

A Yes, sir.

Q And then 224,840?

A I lost that figure.

Q Pardon?

A I am sorry, I went over it. That is right.

Q Census Division 6?

A Yes.

Q 224,840?

A That appears to be correct.

Q Census Division 7, 215,132?

A That seems to be right.

Q And 8, 54,564?

A Yes, sir.

Q And 9, 4,643?

A Yes, sir.

Q And 10, 712,982?

A Yes, sir.

Q And 11, 765,494?

A Yes, sir.

Q And 12, 2,124?

A Yes, sir.

Q And 13, 37,299, is that right?

A No, sir, 37,229.

Q 37,229?

A Yes, sir.

Q Well, I am in error there. My figures are in error there. It is 37,229?

A Yes, sir.

Q And 14 is 470,086?

A Yes, sir.

Q And 15 is 37,962?

A Beg pardon?

Q 15 is 37,962?

A 37,962, yes, sir.

Q And 16 is 500,780?

A Yes, sir.

Q Well, I think commencing with 13 my figures are wrong, so that probably you are quite right?

A I had the tabulations in front of me and they were checked and box-checked, and I am almost sure they are right.

Q They did check?

A Yes, sir.

Q All right, that is all I have.

MR. C. E. SMITH: I am disappointed, I thought we would have to get a slide rule out some place.

MR. STEER: Well, I do not know where I got those figures. Oh, I just have one or two more questions.

Q I just will ask you this, Mr. Trostel, the validity of those, of your estimates of this available gas depends directly upon the validity of the reserve estimates that

have been put in?

A That is correct, sir. It depends on the validity, if you wish to be specific, of the reserves available for sale for those fields for which we have made deliverability schedules.

Q Yes. I would like to refer you to page 743 of the evidence you gave yesterday, your comments there, and you say there this,-

"For example, if we follow through online 2, the Cessford field, the Cessford-Delhi area, the Viking sand reservoir discovered in 1950, the depth of which is shown 2600 feet average, top of gas non-associated..."

A I am sorry, that punctuation is out there, it should be "2600 feet average to top of gas".

Q Yes?

A And the "non-associated", then, is a classification.

Q Yes.

"....particular field status is potential.."

A Yes, sir.

Q And I think this is really another sentence, "Although we show no proved reserves we feel it is very probable and show probable reserves as well as possible in total." That sentence, of course, to me, would indicate, or that sentence indicates to me that you draw a very distinct line between proved and probable gas?

A I think that is merely a question of the class of the proof in this particular case. We do not have a drillstem test as such which we require for proof. However, all other indications show that that is the case, and, as a

matter of fact, a recent well which is now drilling has successfully tested the Viking gas sand in Cessford, and if we were doing it at the moment, it would have been put into the proved classification.

Q I see?

A That is merely without any tests being run at the time we made this classification.

Q But still it follows from the language that you used there that you do draw a distinct line between proved and probable gas?

A Well, we showed no proved reserves, and we did show probable.

Q You see, Mr. Trostel, it is the language that you use that impressed me,

> "Although we show no proved reserves we feel it is very probable and show probable reserves as well as possible in total."

And now what you have told me is that additional evidence which is available would induce you to shift it from the probable into the proved class?

A I think that is the basic concept of our proved and probable, as Mr.Dougherty explained it.

Q Yes. That is all, thank you.

THE CHAIRMAN: I think we might adjourn for a few minutes.

(Hearing resumed after short adjournment).

THE CHAIRMAN: Mr. Steer, have you any further questions to ask?

MR. STEER: No further questions, sir.

THE CHAIRMAN: Anyone else?

MR. McDONALD: Yes, sir, I have some questions I wish to ask.

THE CHAIRMAN: All right, Mr. McDonald.

.....

CROSS-EXAMINATION BY MR. McDONALD:

Q Mr. Trostel, I was wondering if you could give me some information in regard to your calculations of deliverability for Pincher Creek?

A Yes, sir.

Q Will you give me the original pressure that you used in your calculations?

A Would your question require the shut-in subsurface pressure or the surface?

Q Whatever you used, the original pressure in your calculations?

A We used 3,249 pounds per square inch absolute for each shut-in wellhead pressure. That is in Column 8 of the deliverability exhibit which appears on the back of page 4 of Census Division 2 of Exhibit 4.

Q And then what was the original gas in place? It might be right there on that page, Mr. Trostel?

A Our estimate of initial gas in place, with our proved and probable classifications, it appears in Column 16 of page 4 of the just previously mentioned exhibit, and it is in the amount of 2 billion - no, sorry, - 2 trillion, 574 billion, 424 million cubic feet.

Q And your average original open flow?

A The average original wellhead open flow. We used wellhead open flow rather than absolute open flow in all our work.

Q Yes?

A It was 63 million cubic feet of gas per day.

Q And then can you tell me what was the "n" factor that you used?

A We used an "n" factor of .68. That was taken from the Marr No. 1 well before acidization, which appeared to be the best data available to us. We had a talk with Mr. Gray at a later date to see if any additional tests had been run, and he said that up to August 1st that we had the best data available. I do not know that any additional tests have been run within the last few weeks.

Q Yes?

A We do not have any later data.

Q So the data that you refer to then is the data which was discussed during the Westcoast Hearing and again, subsequently, in the Northwest Hearing, in which there was one of .68, one line of .68, and there was a further line, or further data that was discussed, on which Dr. Hetherington based his 1.15?

A I cannot speak for the data that Dr. Hetherington had. All I can say is that on the data we had the slope of .68 seemed to be the best figure available.

Q I might show you a copy of the exhibit that was filed originally. This is from the rec rds of the Gulf Company and it was filed as an exhibit in the other Hearing. You might recognize the chart?

MR. C. E. SMITH: Have you got the exhibit number, Mr. McDonald?

MR. McDONALD: No, I have not, Mr. Smith. I would have to find it.

Q Does that look familiar to you?

A No, it does not look familiar to me, sir. The data that we have here, we had a bottom hole open-flow capacity on Pincher Creek No. 1 of 45 million a day, but that was not acidized. We had the bottom hole open-flow estimate on Marr No. 1 of 14 million before acidization, and something in excess of 83 million after acidization.

Q That is the data contained on this exhibit?

A Yes.

Q You have not available the chart that was prepared and provided to you by the Gulf Company on which you based your finding of .65?

A .68.

Q Or .68?

A May I check the files and see?

Q Yes.

A I might say that if we have one, and I think we may have, that indicates that high an "n" factor, I do not think there would be any use using it because I think that is higher than one would normally suspect, and would probably indicate some lack of stability in the testing. They did not have, I am sorry, they did have a great deal of difficulty in the testing, and we preferred to use the test on Marr No. 1 as being apparently a little better data.

Q That was your view and that was why you took the .68?

A Yes, sir. I do not have reference here to the 1.15 "n" factor, but I believe we did have this data available, and I feel quite sure that we would not have taken an

"n" factor greater than 1 from an experience basis. We would have felt that the basic data on which the factor in excess of 1 was calculated probably had something the matter with it.

Q Yes?

A As I said, the early testing of those wells, having regard to the fluid and so forth, was extremely difficult.

Q So that your thought is that the "n" factor of 1 is in the upper limit, and your experience would dictate that?

A I have seen some over 1, but I have been suspicious of the manner in which the tests were conducted, sir.

Q But have you see any lower than .68?

A Not much.

Q No?

A I would say that is fairly close to the lower limit.

Q And you did indicate once or twice through the discussions yesterday that the figure you took.....

A Was a rounded average when we had no data.

Q The reason I mention that to you, Mr. Trostel, is that I wanted to find some basis for comparison of the various estimates of deliverability from the Pincher Creek field?

A Yes.

Q And then the Board, at page 45 of the Interim Report. . .

A Page?

Q Page 45?

A Yes, sir.

Q In the paragraph commencing "The Pincher Creek Field"?

A Yes, sir.

Q That is the third paragraph on the page?

A Yes, sir.

Q The wording there is,-

"A deliverability analysis of this field indicates that with graduated development from three wells in 1958 or so, to 21 wells in the mid-1970s, the bulk of the deficiency could be met. Actually the analysis showed a remaining deficit of about 60 MMMcf with peak-day deficiencies in the six or so years reaching some 140 million cubic feet in 1980."

On the basis of that the deficiency above referred to is some 605 billion, and that would leave the Board's analysis of deliverability, and having regard to the production over 30 years with regard to the program outlined of some 545.6 billion. Then we come to another one, I want you to comment on these after I have given them to you.

A As you give them to me?

Q No, after I have given them to you?

A O.K.

Q We come to the Ford, Bacon & Davis estimate put in by Dr. Hetherington of 730 billion decimal 4 over 30 years. And then following that I take it that the DeGolyer & McNaughton submission by yourself has a total of 1090 billion for 25 years. Would I be away out with regard to your deliveries - or, possibly this would be better, you can tell me what your total is.

A Well, on a gross, it is 1 trillion, 558 billion, 550 million.

Q And your net is 1090, is it not, on page 1 of Census Division 2 of Exhibit 23?

A Would you repeat that back to me, the number?

Q Exhibit 23?

A Yes, sir.

Q Of Census Division 2?

A Yes, sir.

Q Page 1?

A Yes, sir, that is correct.

Q And it is 25 years, the period of delivery?

A That is correct.

Q Then we have a submission by Dr. Brokaw on behalf of Northwest Natural Gas, and this has not been given a number yet. Reading his submission and schedule "E", the total production that he would take from Pincher Creek is 1125 billion cubic feet in 20 years. Now, the Ford, Bacon & Davis exhibit shows that the open flow that was used was from 25 to 59% on the basis set out in Dr. Hetherington's submission. Now, could you explain how you arrive at your open flow, or your percentage of open flow in your exhibit of your study with regard to 1090?

A This is one of our earlier exhibits, which we did not revise, and I do not have in front of me the percentages of open flow. However, I can calculate them at intervals, or were you through with your series of questions?

Q Yes, I am, that is right.

A If I might refer to the exhibit. On the back of page 4, Census Division 2 of Exhibit 4?

Q Yes?

A We show in Column 9 there the estimated minimum total open-flow capacity at year end in Mcf per day. I believe that is the only place where we have used the word "minimum"

because we felt that our 63 million a day open flow average well, which we use, comparing with acidized conditions of a well in excessof 83, was a conservative figure, but as of the first year we have an estimated minimum open flow of 610.

Q Yes?

A Thousand Mcf per day, and we proposed a daily average of 100,000, and I believe that is something like 17% of our calculated open flow. Now, I do not know how frequently you would like me to do this.

(Go to page 827)

A In, say, the 5th year we have a figure of open flow capacity at the time we have 20 wells of 1 million 060 thousand Mcf. per day, and it is supposed to produce a daily gross average of 190. 190 divided by 1,060 would be about 17-9/10ths per cent of the well head open flow capacity. We may now jump down to the 10th year wherein the minimum open flow capacity has declined to a value of 840 thousand Mcf. per day, and for that period, still taking out 190, that calculates to be 22-6/10 per cent of the open flow wellhead capacity. Now, in the 15th year we are still maintaining 190 thousand Mcf. per day with an open flow capacity and that now has declined to 640 thousand Mcf. per day and we are now up to 29-7/10 per cent.

Q That is your daily average?

A That is our daily average gross gas production, yes, sir. We then start reducing the gross take from the field. It drops then at the end of the 15th year to 180 thousand, and if I may run that down to, say, the 18th year wherein 540 thousand is the estimated minimum total open flow capacity. 180 divided by 540, we are now up to 33-3/10 per cent of the open flow capacity. As a matter of fact, I see from our work page I do have those calculations and I can read them faster. The 15th year we are up to 33.9 per cent; the 17th year, 33.6 per cent; the 18th year 33.3 per cent; the 22nd year, 34.1 per cent; the 23rd year, 35.4 per cent; the 24th year, 35.1 per cent; the 26th year, 37.1 per cent. I might say in this regard, Mr. McDonald, that those deliverability schedules

are a maximum. Now, when we get to finally the needs of the Province, we do not take as high figures as these quite.

Q Yes, these are calculated minimum open flow, as I understand it?

A That is correct.

Q The figures you have given us would be the figures provided it was 100 per cent load factor?

A Yes, the figures I have cited were for 100 per cent load factor.

Q So on a 75 per cent load factor your percentage of your peak load would be considerably higher. Could you give us that for, say, the 1st, 10th and 20th years with 75 per cent load factor?

A That should be 1-1/3 times the values which I have just cited.. For the first year it would be 22.9 instead of 17.2. What were the other years you asked for, please?

Q The 10th.

A The 10th year would be 30.1 against 22.6.

Q And the 20th year?

A I don't have the 20th year.

Q The last year that you have?

A If I may jump to the 22nd year.

Q That will be fine.

A It would be 45½ per cent against 34.1 on the basis of a 75 per cent.

Q Now, since you have your work papers there, what percentage of shrinkage did you allow for?

A We allowed 30 per cent over all to take care of shrinkage, field use, treating losses and so on.

Q Now, would you turn to the Jumping Pound field, Mr. Trostel?

A Have you a particular reference to which you would like me to refer?

Q Yes, census division 6, page 4, in Exhibit 10. There is just one question before we leave Pincher Creek, Mr. Trostel. What was the maximum number of wells which you intended to drill?

A 20, I believe. I am almost sure. Yes, a maximum of 20.

Q And what year did you reach the 20, the full number of 20 wells?

A The 5th year after export or whatever utilization of the Pincher Creek gas comes into effect.

Q On page 4 you set out the information with regard to the Jumping Pound field?

A Yes, sir.

Q If I read it right, you start with average shut-in pressure of 3,003 pounds?

A Average wellhead pressure.

Q And the gas in place, original gas in place?

A That was taken from the estimate of the Conservation Board.

Q Yes.

A I'll see if I have that figure.

Q It was the same figure as used by the Conservation Board, Mr. Trostel?

A That is correct, sir. We used recoverable reserves of

772,000 million cubic feet. That appears on page 1 following census division 6 of Exhibit 4. I do not mean to confuse you. It also appears at page 1 of census division 6 of Exhibit 10 as well, which might be easier to find.

Q You used the gas in place as calculated by the Conservation Board also, did you?

A Yes, we used estimates of the Conservation Board on the field entirely for reserves.

Q What end factor did you use?

A We estimated .85. We had no data available on that that we could use.

Q That is all I have, Mr. Trostel.

EXAMINATION BY MR. C.E. SMITH:

Q You will be glad to know, Mr. Trostel, that the few notes I have made have been dealt with pretty much this morning but just an odd question or two. If I heard you correctly, you said you had used the Conservation Board's figures with respect to your estimates for Jumping Pound. Is there any other place where you adopted that principle?

A I think that was the only major reserve. As I recall, we used several of the Conservation Board's estimates for the small fields in our Exhibits 4 and 4-A. I believe that we have made our own estimates on most of those that now appear in Exhibit 10.

Q What I am getting at is this, that you could not have used very many of them or you would not be so far apart

in your end result, would you, Mr. Trostel?

A Well, no, sir.

Q What was the reason for using what you call the Board's figures in respect to Jumping Pound? Was it because your client was not particularly interested in it, or what?

A We did not seem to be able to get satisfactory data, sir, on that field.

Q And is there some truth in my suggestion that probably Delhi was not interested in Jumping Pound in view of what we have read in the papers?

A I can not answer that question. We asked to get all data possible on all fields to the Canadian Delhi and this happens to be one.

Q Either did not have enough or did not give it to you?

A One or the other.

Q All right, that is good enough, one or the other. Mr. Trostel, yesterday you read into the record a portion of a letter from the Board. You remember that, do you?

A Yes.

Q Have you it there?

A Just a moment and I will find it.

Q And I wonder if you would look at the paragraph which you read yesterday.

A I read several paragraphs.

Q About paragraph 3. Unfortunately I have not got a copy of it. Would you mind if I looked at your copy? Paragraph b, it is headed there, Mr. Trostel. Have you it?

A I have it in front of me, sir.

Q And I think you read paragraph b and omitted 1, 2 and 3 under that paragraph. As a matter of record, would you read those in for the record?

A I am almost sure I did, but I will be happy to. As a matter of fact, I did read them into the transcript. I do not know how they got left out.

Q I may be under a misapprehension.

A I will be happy to read them.

Q Did you read 2 particularly?

A Within economic reach of a market - -

MR. NOLAN: On page 728.

Q MR. SMITH: It was read it, was it?

A It is surely my understanding.

MR. NOLAN: On page 728.

Q MR. C.E. SMITH: I just got my copy this morning. In any event, did you give the same consideration to 2 as you did to the rest of the suggestions, Mr. Trostel?

A We surely thought about it.

Q Pardon?

A We certainly thought about it. You almost have to deal with 1, 2 and 3 simultaneously and so far as 3 is concerned, beyond the economic reach of a market, we have only classified those fields in census division 17.

Q Yes, I remember that.

A We considered the economics involved in section 2 and felt that seeing we are taking a 30-year position that we did not know of any reserves that we had estimated except possibly a few of the little ones that might be within economic reach, within economic reach of a pipe

line. That is, there are some that have local use but in our opinion it seemed to us within a 30-year period there is no reason why any of the reserves we have estimated should not prove economic for some type of use, either local use or to be picked up by some pipeline system.

Q Well, I do not know whether I understand you with respect to that when you say "should have some use". Do you mean should have some use if somebody is willing to pay the price, is that the idea?

A Most certainly there are some small fields in their present stage of development and knowledge that would not justify building a pipeline to at the present time.

Q Or drilling wells, I suppose? They combine, I take it?

A That is right. As you drill wells you know more about your reservoir and may find it bigger than you anticipated it. On the basis of reserves that one can presently see there are some fields in that category. I think in nearly every case we had left them out of deliverability schedules although we have estimated the reserves. Perhaps we omitted making a special classification or something to tie with those smaller reserves.

Q In other words, in so far as the results of your consideration on those various exhibits are concerned, you have taken into consideration the things I mentioned in this letter, is that correct, Mr. Trostel, and the Board can so conclude?

A Yes, that is our feeling, sir.

Q On the question of costs, just a layman's funny little

question, and somebody drills 57 additional wells in Turner Valley, can you give me any idea as to what percentage of the cost of that would mean to my furnace?

A No, sir.

Q Mr. Bredin would like to have that. You know what I have in mind?

A But I do not have the answer to your question.

Q Can not give me an approximation of it or anything of that nature?

A I am just not familiar with the price structure, the operation of the pipeline.

Q Somebody will stop me if I go further into this. I thought you might help me by way of some idea, Mr. Trostel.

A I would like to but I just flat out don't know.

Q I would like if somebody could.

MR. PORTER: You can never get that answer from a producer.

MR. C.E. SMITH: Producer of what?

MR. PORTER: Gas.

Q MR. C.E. SMITH: And one other question, Mr. Trostel. You use the term "estimated future availability of natural gas - Province of Alberta, Canada", and purely as a matter of help and information, are we to assume that the use of your word "availability" is the same as the word used by the Board in their Interim Report starting at page 26, I think it is, "deliverability". You have undoubtedly read that section of the Report?

A Yes, sir. I think my use of "availability" and

"deliverability" are synonymous.

Q That is what I want to make certain of.

A That is right.

Q We should not think of any distinction in your word "availability" and the Board's use in their Report of "deliverability", is that correct?

A That is correct.

Q And I take it that you have considered the Board's suggestions in their phase of their Report dealing with the problem of deliverability?

A That is an awfully open-handed question. I am not sure just what is implied.

Q You have read it then?

A I have read it, yes.

Q And considered it?

A Yes.

Q And paid particular attention to some of the factors suggested by the Board, for instance?

A In regard to deliverability?

Q Yes?

A We made that attempt, sir.

Q And that can be applied to your submissions, and when I say "that can be applied", we can take it that you have considered those various things stated in this Report, is that correct?

A That was the basis on which we worked.

Q I mean, there is no exception or explanation that we need further?

A I do not think of any.

Q No. In so far as your considerations are concerned, that is all I want to get at.

A That is right.

Q We are talking about the same thing now as the Board were talking about in their Interim Report, is that correct?

A That is correct. It is our interpretation of the same factors.

Q Well, that is what I mean. I should have put it that way.

A Yes.

Q And in considering this question of availability, you did consider some economic factors, did you not?

A Yes, sir.

Q For instance, gathering costs, processing costs, you dealt a bit with that this morning, picking up costs from fields adjacent to population and so on. Your thinking along those lines have all been applied to the submissions you made?

A We made no specific calculations as to the exact economics of picking up gas in any particular field but we certainly gave that consideration in our general thinking.

Q Probably I can give you an example which came up this morning from a question of the Chairman of the Board. You remember what you called the Valley in your Leduc figures?

A Yes.

Q As you go along for about the end of 20 years and then you jumped up, I think, to 100,000?

A Yes.

Q And then it is 5?

A That is for the D-3.

Q Yes. And I think the Chairman asked you something about the question of plant there and you said it might require a little extension.

A Yes, sir.

Q Do you remember that?

A Yes, sir.

Q Would it require an extension or a whole new plant in your thinking, Mr. Trostel? I am using this only as an illustration.

A I am not as familiar as I should be to answer that question. Actually, it seems like some 40 per cent of the gas production in the field now is being wasted. It would appear to me it is not going through the plant.

Q I am talking about the capacity of the plant to handle what you have in your figures?

A The plant apparently in its present state is unable to handle the current production let alone an expanded production.

Q That probably answers the question. Have you anything in mind that might affect this question such as that illustration probably does?

A I might repeat one thing I mentioned a little later to Mr. McDonald, and that is that I would like to expand on that if I may.

Q That is what I want.

A And that is in our calculations of deliverability or availability, as we have called them, we attempted to

set up a logical procedure and drill out and produce the field on a basis that there was an available market, and we did not try to fit our totals to anything in particular until we got all through. Then we took the overall result and said, now, these figures which we have calculated provide a framework from which we can calculate some other rates which lie underneath these, and those were done only for the Province as a whole and consequently the figures cited in the volume 23, I believe it is, or Exhibit 23, are more or less potential limitations on the rates which are finally proposed in Exhibits 25 and 25-A.

Q And I gather that from your answers to Mr. Steer, particularly about Turner Valley, but you emphasized the idea on the basis of the Province as a whole and assuming that we will have markets, is that correct?

A Those two were considered.

Q That brings to mind this, having regard to your 25, I think it is, or 25-A, probably, that is the chart that you just corrected, I think?

A Yes, sir.

Q In so far as Provincial requirements are concerned and your line or whatever you call it, dealing with it, there is nothing on 25 -- is it 25 or 25-A -- nothing on 25-A which would take into consideration the fact that Pouce Coupe, if it had to feed the City of Calgary here, is geographically located quite a long ways off, and the consequent expense and costs?

A This is only a statistical assimilation of the data.

I might enlarge on that a bit to the effect that we did not see how it would be reasonable to attempt to assign a field here to a certain market, a field here to a certain market, set it up in the manner because certainly the Utility Companies would not build a long line when for perhaps by waiting six months a field would be found in their immediate back yard. We did not feel we could make a field-by-field assignment.

Q No, I think they feel they would like to wait as long as they can to find something closer to Pincher Creek or some place else, that is quite true. You say those types of consideration do not apply to your submissions or we should not assume they have been applied in any way, shape or form, it is purely a general Provincial picture?

A We attempted to build up a Provincial picture.

Q Starting with your own system of reserves?

A Our own system of reserves.

Q And I think somebody said that is probably the greatest factor,in estimating deliverability, to be considered?

A Certainly the deliverability figures have to be keyed to the reserves.

Q And from that you build up through the whole Provincial scheme,is that the idea?

A Yes, sir.

Q Including, of course, the probability of export, I suppose, if that is a fair way of putting it?

A The whole picture, of course, was built up on an incentive to develop these fields which have been found, and I think that incentive could only be provided by a market

in excess of that which is done enjoyed and which I presume will come from export.

Q Just one other question, Mr. Trostel. Dealing with this, I think you were referring to Leduc at the time, I think you made the remark that depending on the operator, when we are getting the gas, either perforation or new wells?

A Yes.

Q Did either one or the other method have any effect on the submission you made?

A No, it does not depend on either one or the other. I presume the operator would do it in the most economical manner.

Q We get no further then than that with you, just that the operator would do it the best way he thinks fit?

A Yes.

Q How about those multi-horizons or formations, we might have the same situation? Does that still apply there?

A Certainly, sir. We there have dealt with bore hole completions, if you like, and if you can satisfactorily arrange to have two or three in a well and save drilling costs, that is certainly the thing to do.

Q That is something you say is a matter for your operator and it is nothing that has to be considered with respect to your submission?

A That is correct. We have made no attempt to go to that length.

Q I think that is all. The others have been dealt with about three times. That is all.

EXAMINATION BY DR. GOVIER:

Q Mr. Trostel, I wonder if you would look at Exhibits 25 and 25A?

A Yes, sir, I have them in front of me.

Q Will you tell me if I am right in this assumption that these two exhibits summarize your answer to the general question as to how may the requirements of the Province and those of the Delhi export market be met over the next 30-year period?

A Yes, sir.

Q Now, Mr. Trostel, you have just finished telling Mr. Smith that while you did not take into account many economic details in the development of the availability tabulations, you did consider in a general way the various economic factors involved, and I think Mr. Smith referred to those on the lists on page 26 of the Board's Interim Report, is that a fair way of putting it?

A Yes, sir.

Q You did not go into details but you considered the matter in general terms?

A I think that is a fair way to put it, sir.

Q And, again, is it right to say that Exhibits 25 and 25A made no provision for geographical factors?

A That is correct.

Q And as Mr. Smith pointed out, the Pouce Coupe gas might conceivably be destined for Calgary so far as these are concerned?

A Yes, that is right. There is no attempt to assign a particular reserve to a particular market with the exception of the fact that in calculating the deliverability of the

Trans-Canada gas we assign the group of fields which we propose, as shown in our exhibits.

Q Yes, I understand that. When these two exhibits, Exhibit 25 and Exhibit 25A, are summarized, they are summaries of a statistical analysis showing how the Provincial and the export requirements may be met without regard to geographical location of reserves except to the degree you have mentioned, and with some, but no real, detailed consideration given to economics, is that right?

A I think that is a fair statement, sir, of the situation.

Q Do you think then, Mr. Trostel, that Exhibits 25 and 25A are of any value in determining whether or not from the practical and economic points of view, all factors considered, the Provincial and the proposed markets, the proposed export markets, may be met?

A Absolutely, as a framework of the over-all basis, I certainly do.

Q Even though geographical factors are not considered?

A Yes, sir.

Q And even though there is a partial consideration given to economics? You see, the problem is this, Mr. Trostel, and I think I understand Exhibit 25, the graphical presentation, and it seems to show that the export and the Alberta markets fit very nicely into the possible availability, and yet you have told us that your estimation of the total availability is statistical, a statistical sort of thing?

A That is right.

Q And that it does not take into account many of the

actual economic and geographical problems. Therefore, I wonder, does this mean it can be done on a statistical or hypothetical basis but perhaps not on a practical basis?

A Well, I will grant that if you will grant me that there will be no gas reserves found in the next 30 years.

Q Well, of course, we are assuming that we are discussing the reserves that you have estimated as presently known?

A Well, I do not feel that the solution will ever be made in the future, but I think that it is so, that if it does so that it could be done. In other words, that if it were necessary to supply the needs of the Province of Alberta solely from the existing reserves, as now known, as we have estimated them, and with the deliverability studies which we have made, it would be possible, possibly not too practical, but it would certainly be possible to accomplish the effect shown on Exhibits 25 and 25A. I do not like to tear this exhibit down by saying it is not practical. On the other hand, since we are restricted in our scope to solving the needs solely from the fields that we can look at now, then we have said if that is the total reserve that is going to be available to Alberta, then it will be possible to meet the needs in this manner. Now, we do not recommend it as a procedure, or as a system that should be followed, but merely as a means of saying that it could be done, or showing, I mean, showing that it could be done if need be. I do not know whether I have clarified my position on that or not.

Q I think perhaps you have, Mr. Trostel. Is it this, that

you feel that inasmuch as to a degree you are confining your attention to presently known gas, and at the same time to a future market, that you should, in considering the presently known gas, be quite generous in your outlook, since you have in the back of your mind an idea that there is going to be more gas later anyway. Are you stretching your notions of what is practical and economic because you are quite sure there will be more gas to back it up anyway?

A I do not like the way you have phrased your question.

Q I did not mean to put it in an improper way, Mr. Trostel. You say it?

A I thought I just did, but I will try again.

Q Yes?

A And that is this, that in our opinion to attempt to draw a deliverability schedule, and to get gas from one field to another, as we now know them, from one district to another, where that could be done in many cases, the economics would, obviously, be poor. No utility company would want to go and build a long line to an outlying field now, because the management of this company would cause a great deal of trouble with him in probably two years when they found a closer field, so that the expenditure would be lessened at that time. Now, that is the thing that kept us from making a point by point assignment of this much gas for this field, and this much gas for this field, all through the picture, because we felt that was not a practical solution. On the other hand, if one assumes that there will be no more gas found in Alberta for a period of 30 years,

then I say that the calculations in Exhibits 25 and 25A could be achieved, but I appreciate that there would be a substantial cost per Mcf.

Q If I were to ask you how this plan proposes to meet the expected deficiencies of the Canadian Western Natural Gas Company system, would you be able to give any specific answer?

A No, sir. I did not - we did not base our work on any specific assignment of any gas to a specific company.

Q Would you answer it that on the basis of your statistical analysis there would be enough availability in the Province to do the job, and you do not know how much it would cost, assuming that there is no more gas found, Mr. Trostel?

A Yes, that is right.

Q I did have one other question, Mr. Trostel?

A Yes, sir.

Q It is in connection with the point raised by Mr. McDonald, where you mentioned in the development of your availability study of Pincher Creek you assumed the well-head open flow of 63 million?

A Yes, sir.

Q And a slope of .68?

A Yes, sir.

Q Which, in your opinion, was the best value to take from the data available?

A That is correct.

Q And my recollection of Dr. Hetherington's comparable study was that he used 1.15, and I think that Mr. McDonald referred to that, as a matter of fact?

A That is right.

Q I would just like to make sure that I am right in this, Mr. Trostel?

A Yes, sir.

Q Is it true to say that if you accept 63 as an open flow, that the use of a slope of .63 . . .

A .68.

Q Yes, the use of a slope of .68 will give rise to a slower expected rate of deliverability decline than would the use of a slope such as Dr. Hetherington used of 1.15?

A Certainly.

Q So that we might say that Dr. Hetherington's figure, while being beyond the requirement of your suggested .68 to 1, is perhaps a more conservative figure? Is that proper?

A It would be more conservative, that is correct, I believe. In the over-all picture he used a higher average well-head open flow, although I do not recall whether you would have to consider both.

Q Yes. But from the point of view of the slope it would be more conservative, although you do not believe it is a proper figure to use, is that right?

A No, sir, I do not believe it is a proper figure to use. I would not say that the .68 is the proper figure, but we thought it comes to the best figure we had, based on the data available.

Q There is just one other question, Mr. Trostel?

A Yes, sir.

Q In Jumping Pound I notice that your availability schedule reflects the drilling of only 8 wells. How was that arrived

at, Mr. Trostel?

A Well, from data availabe to us we estimated an average well-head open-flow capacity initially of 13,000 Mcf per day, and we found that it was not necessary to drill more than 8 wells on the basic assumptions involved, in order to arrive at the figure which was shown on this exhibit. Generally speaking, we drill only a minimum number of wells to achieve the productivity proposed. That is, there is a good deal of flexibility on how you decide or on how you like to produce a field from a deliverability standpoint.

Q Yes?

A If you wish to take the reserves out faster, and you have some restriction like a 25% open flow, then you drill more wells and you are able to take the reserves out at a faster rate. We had selected a rate which we thought reasonable and, according to the percentages of open flow we used, we drilled a well.

Q I guess I have been under a misunderstanding. I thought that you had decided on how many wells could be drilled and on that basis, on the basis of that, arrived at what you could produce from the field, but you worked it the other way, did you?

A We worked both ways. At least, there had to be a common meeting ground. That is, we would not continue drilling up a field where they lost money drilling wells.

Q Now, that means, looking at Exhibit 25, that that curve could be actually higher if Jumping Pound were drilled out to a greater extent, is that right?

A Yes, sir.

Q Are there other similar instances?

A Oh, certainly. We view our results, the results of the deliverability work, which is summarized in Volume 4, as kind of a minimum thing. It is just our judgment of what would be a reasonable development program. We have not strained to get everything out we could, but we have tried to make some reasonable balance of economics. Generally we were guided by a concept that we ought to get most of the reserves out in 30 years.

Q Thank you.

EXAMINATION BY THE CHAIRMAN:

Q Mr. Trostel, I do not know whether I should address this to you, or possibly Mr. Porter, but in the letter that the Board sent to you or to your client, dated October 2nd, in which in paragraph (e) we asked the question,

> "The manner in which the applicant proposes that the present and future requirements of the Province may be met from the existing reserves of gas, showing in detail and through a deliverability schedule, how the annual and peak loads may be satisfied for a period of at least 30 years."

Then in (1) we ask the same question in relation to how the requirements for your line may be met. Now, do I take it that there will be no further evidence to answer those questions? That we are to take this Exhibit 4, 4A, 10, and this exhibit here, Number 23, together with Exhibits 25 and 25A, and that is all the help that you will give towards

answering those questi ons?

A We have given you all that DeGolyer and MacNaughton have done, sir, as far as I know.

Q I take it as far as trying to decide what fields you suggest that should be earmarked for Provincial requirements, those would be the ones that are not reserved to Trans-Canada?

A That is correct, sir. I do not know if - I believe I mentioned that in discussing the deliverability charts, Exhibits 25 and 25A, yesterday, and that is that later in the life it is not possible to meet the requirements of the Province out of solely those fields not proposed as supply fields to Trans-Canada, and at which time the Province's needs will come first before Trans-Canada, and the Province will be satisfied out of certain of the gas produced from the proposed fields. I believe, as I recall, that is a period of 24 years before that happens.

Q Mr. Trostel, if you were in the Board's position, how would you go about deciding what reserves or how the Provincial requirements should be met and how the requirements of your line should be met from the information you have given us?

MR. PORTER: If he can answer that question for you, I am going to be sore at him, because I asked him the same question.

MR. C. E. SMITH: It depends a lot on who asks the question.

A Well, if I were the Board and I had as much confidence in me as I have in myself, I would accept these figures.

Q THE CHAIRMAN: I take it, Mr. Trostel, that you

would just allocate all of the fields that you say in there for Trans-Canada, that we would just allocate them to Canadian Delhi for their export line, is that right?

A Well, I believe I mentioned at the time we discussed this letter that this is only a tentative schedule that has been set up here.

Q I realize that, but what I was asking, if you were in the Board's position, I was asking as to how you would solve this problem whereby we have to assure the people of this Province that their requirements are being looked after from the existing reserves of gas?

A I think we have done our best to show you the way, sir.

Q And you do not think you can give us any assistance at all?

A Over and above that.

Q I think the Leduc field deliverability schedule of yours is a good example of the problem that this Board is up against. There is the matter of cost to the consumer; that is one thing. I think you would have to take into consideration the cost of any processing plant that might be established, together with the cost of the gathering system, and then wouldn't you try and schedule your gas production, if at all possible, so that that plant would be used to its gross capacity, its greatest capacity, for the greatest number of years?

A I think that would be good economics.

Q But you did not attempt to do anything like that at all?

A No, we did not, sir. That, again, ties into the flexibility. That is as to what happens, and I guess I should not bring this up again, but what happens if a field is found nearer

an area, if you plan to take up the gas 5 years from now and to have a schedule of this type, and then you find a different one in the meantime. I appreciate that is not part of the question, but yet it is almost inseparable in trying to set up a specific schedule of economics on a long-range plan basis. Now, I do feel that certainly there ought to be some tie between plant capacity and the economics of sufficient gas production in the field that the plant can run on an economic basis for a long period of time. Yes, I believe that should be done.

Q I mean, what do you think about that? You would have to think of that to protect the consumer in some way and the producer, because one way or the other it is going to be reflected in the price paid to the producer, or the price that the consumer is going to pay?

A Well, in the case of the gasoline plant, of course, by maintaining a good operation of the plant you are bound to protect both the producer and the consumer.

Q Take the case of the Calgary system where they are now being supplied by Turner Valley and Jumping Pound, and I believe the Olds field was mentioned as a possible source of supply, would not that necessitate, if those fields and plants were going to be operated at a high load factor, some kind of a storage system for the peak?

A Yes, I think that is correct. We have given no consideration to a storage system, but I believe that certainly the load factors of the current utilities are exceedingly low, and, looking down the years into the future, it would be certainly indicated that the use of storage for peak would be important.

Q You see, Mr. Trostel, we had hoped that you could give us some assistance in solving these problems.

MR.PORTER: Now, I am going to take some responsibility for that, Mr. Chairman, and perhaps this is the time to do it. We very seriously considered the problems that are raised by the Interim Report and the requests that were made in the letter of October 2nd. A good deal of time was spent on it, more than Mr.Trostel has acknowledged. He is a little modest about it. My advice to my clients was that this Board was not going to permit anybody to export gas anywhere until there had been proved an abundance beyond doubt, and that the thing to do was to get some drill rigs together and find some abundance. And I am seeking to demonstrate to this Board by every available means in our power what we now have. Now, this availabilty study is made, I think, by a worthwhile examination in great detail of the physical conditions under which this gas is found and is held. It comes up with 8 trillion 400 billion feet of gas to serve an aggregate of 3 trillion, just over 3 trillion, for the Province, and 2 trillion, 2, for this contemplated line. Assume you remove economics entirely from the thing and divide up the 8 trillion 4, we arrive at a position as indicated by this exhibit, where, in the year 1973 it becomes necessary to cut down on Trans-Canada's take in order to serve the Province, preserve the gas to serve the Province's needs to 1980.

Now, it was my advice to my clients that there was no use going through the business of building castles in the air at great expense and a

physical delivery structure and its planning at this stage can be no more than a castle in the air because the rate of discovery and the geography of discovery is such that any plan we would draw this year may be scrapped next year. And my advice to them was, "Let us find out what we can about what is here, let us add to it by our own effort as much as we can by drilling, if we believe in the country, and then we can come to the stage where there is that abundance of gas that the fears of the people of Alberta about the loss of their part of it can be satisfied." Then we will lay down a system of removal within the framework of the declaration of policy that has been made in this Province by the existing Government, namely,"Alberta first and Canada next,"and the declaration of policy that has been laid down by the Federal Government,"no export unless and until Canada's needs are satisfied or it can be demonstrated that they are incapable of satisfaction."

Now, that is the advice I gave my clients, that is what it is based on. We have come here to help the Board with all the information we know how to produce,to study and be sure of the amount of gas that is available. We have come here with more drilling rigs than any developer in oil or gas in Alberta to try and find some more, and we hope to create an abundance from which there will be enough for the needs of the people of Alberta beyond any doubt, and particularly their doubt, and that the surplus will be adequate to serve Canada.

Now we have not laid any pipe to particular fields, and if we have any responsibility in that respect, sir, in my own case I advised my clients that before we started to divide something up we had better find out what we have to divide, and I am sorry if we cannot help you to do what, in my judgment, this Board, I am afraid, cannot do either, to divide up something until we know what there is to divide; and that is the reason that there is not in here some information of that kind.

Now, we propose at the next session to come along with a gathering system built again around the arbitrary and illustrative and tentative selection of these fields which will give some idea of what tentatively is in mind; but it is only tentative, and that alone will have to be shifted as discoveries indicate the wisdom. It seems to me so easy to illustrate. We have got Pakowki Lake, we have Cessford, we have the expansion of the Viking-Kinsella, all within a matter of a relatively few years. We have that great big field in Medicine Hat. If three years ago someone had come here with a plan for taking gas within or without the Province, or laid pipe to take it from anyone else, he would probably be in bankruptcy before his project was through.

(Go to page 855).

I came to the conclusion and so advised my clients, at any rate, that until there was such an abundance of gas as it was clear to everyone that there was an exportable surplus that no practical division or practical isolation of fields could be made that would have any significance, and that is why this material is in its present shape, our hope being that the Board will find and its engineers will find on examination of this exhaustive study that these figures are not too optimistic and that there is within the difference between 8.4 and 5.2 trillion a very satisfactory margin of safety within which then we may study, if you like, some isolation of areas. I am sorry we can not be of more help, but that is the best I know how to do.

THE CHAIRMAN: Thanks, Mr. Trostel.

MR. TROSTEL: Thank you, sir.

MR. PORTER: Mr. Harries is here and can be available but I doubt the wisdom of it. I think it is wrong to break it and have to carry two books.

THE CHAIRMAN: We will adjourn until tomorrow morning.

(The Hearing then adjourned until 9:30 A.M., Wednesday, September 26th, 1951.)

The Province of Alberta

PETROLEUM AND NATURAL GAS CONSERVATION BOARD

Application for Permission to Remove or cause to be removed Natural Gas from the Province of Alberta, under the Provisions of the Gas Resources Preservation Act by Prairie Pipe Lines Limited.

I. N. McKinnon Esq., Chairman

D. P. Goodall Esq.

Dr. G. W. Govier

Session:

Volume_____